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ORIGINAL RESEARCH

Repetitive Eating Questionnaire: Reliability and Validity of Turkish Version and Correlates of Grazing Behavior

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Abstract

Objective: Grazing behavior which is defined as repetitive and unplanned eating behavior with small amounts of food over a period of time, has been increasingly recognized among people with obesity and eating disorders, as well as in the general population. The Repetitive Eating Questionnaire (Rep(eat)-Q) is a 12 item self-report scale which was designed to measure the grazing behavior. It demonstrated a compulsive and non-compulsive form of grazing in previous studies. The aim of the present study was to assess the validity and reliability of the Turkish version Rep(eat)-Q in a community sample from Turkey.

Methods: Permission was taken from the designer of the measure. Ethical approval was granted from the local Ethics Committee. The Turkish version was developed by translation and back-translation and the opinions from the local experts were obtained. The Rep(eat)-Q along with a purpose-designed socio-demographic form and other self-report measures (SCOFF eating questionnaire, Yale Food Addiction Scale, Eating Disorder Examination Questionnaire) were administered online to 263 of people from a convenience sample using a snowball technique. Internal consistency, convergent and divergent validity were calculated. Confirmatory factor analyses were also conducted for the factor structure.

Results: The mean age of participants were 34.4 years with 77.2 % being female and their mean body mass index (BMI) was 24.7 kg/ m2. As in the original scale, the fit of the two-factor structure (compulsive grazing and repetitive eating) was analyzed by Confirmatory factor analysis (CFA). CFA showed that the Turkish version had a two-dimensional structure similar with the original form and indicated good fit ($\chi 2$ =122, df = 48, $\chi 2$ / df = 0.77, RMSEA = 0.973, CFI = 0.962, TLI = 0.981, SRMR= 0.028). In our study, positive and moderately significant correlation between BMI and Rep(eat)-Q compulsive subscale was found; no significant correlation was found between the repetitive subscale and the BMI (r= 0.156; p=0.07). The Rep(eat)-Q scales showed excellent internal consistency both for the whole scale and the two subscales (total scale Cronbach's alpha 0.947, compulsive grazing Cronbach's alpha 0.931; repetitive eating Cronbach's alpha 0.916).

Conclusion: The results of this study suggest that the Turkish version of Rep(eat)-Q seems to be a valid and reliable tool in assessing grazing behavior in a non-clinical Turkish sample. It also confirmed the proposed two factor structure (compulsive and non-compulsive) supporting the two subtypes of grazing behavior. Further studies are needed to assess its validity and reliability in clinical subgroups.

Keywords: Eating Behaviour, Grazing, Reliability, Validity, Repetitive Eating

INTRODUCTION

There has been an increased interest in maladaptive eating patterns such as binge eating, emotional eating and food addiction in the eating disorder (ED) literature (1-3). Grazing is a relatively newly defined eating behavior that was reported to be associated with obesity and eating disorders (4, 5). Grazing is described as taking small/modest amounts of food outside of planned mealtimes and eating repetitively without being related to hunger or satiety (6, 7).

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Two subtypes of grazing have been defined: a) compulsive subtype associated with the inability to resist eating and reverting to snacking on food, which is more like subjective and objective binge eating with the loss of control feature being decisive, b) non-compulsive subtype associated with the distracted/mindless eating behavior without loss of control (6, 8, 9).

The descriptive criterion for the grazing behavior with the highest agreement by the experts in the field includes it being "repetitive", and there is also a high agreement on eating a "small/modest amount of food" in an "unplanned" fashion. The consensus on the loss of control is minimal. The definition of repetitive is more than two eating episodes in the same period (the morning/ afternoon/ evening/ consecutively during the day) and no long gaps between eating events (6).

Studies indicate that grazing behavior is common in pre and post-operative bariatric surgery patients, clinical population with eating disorders, and community samples. It was reported that grazing was observed in 33.2% of patients presenting with obesity before weight loss, in 28.2% after weight loss, and in 62.2% of those with accompanying eating disorders, predominantly binge-type (10). Others found the grazing behavior in 33.0% of the population after bariatric surgery, 57.6% of those with bulimia nervosa, 34.3% of those with anorexia nervosa, and 44.0% of binge eating disorder (4,33). Additionally, grazing or nibbling was reported at least once a week in 81.0-90.0% of the student and general community samples (9, 11). Despite the evidence that grazing is relatively common in the general population, there is mixed evidence as to whether grazing is a harmful eating behavior. For bariatric surgery patients, several studies revealed that grazing behavior is associated with poor outcomes after surgery (7, 12-15).

Overall, a systematic review of the grazing with obesity and eating disorders has reported more negative outcomes such as lower weight loss, higher weight gain, affective and cognitive dysregulation, lower body image, lower health-related quality of life, and more depression and anxiety symptoms in grazing cases with a sense of loss (10).

There have been attempts to standardize the assessment of grazing in the eating disorders literature (9). One of the instruments developed to evaluate grazing behavior is the Repetitive eating questionnaire (Rep(eat)-Q) scale. It is a 12-item self-report questionnaire developed by experts in the field. The scale proposes compulsive and non-compulsive/repetitive subtypes of grazing behavior. In the development of the scale, a study was conducted with a nonclinical sample and bariatric surgery patients (7). After the original publication of the scale, the validity and reliability study was conducted only in the Norwegian version with university students which confirmed the two-factor model and supported the conceptual distinctions between compulsive and non-compulsive subtypes (16).

The purpose of the present study is to adapt Rep(eat)-Q Scale to Turkish culture and to examine the validity and reliability of the scale in a community sample. The secondary aim of the study is to examine the some correlates of grazing behavior in the current sample.

MATERIALS AND METHODS

Permission was taken from the Rep(eat)-Q designer. Ethical approval was granted by the local ethic committee. The Rep(eat)-Q along with a purpose-designed sociodemographic form and other self-report measures (SCOFF eating questionnaire, Yale Food Addiction Scale, Eating Disorder Examination Questionnaire) were sent online to WhatsApp ™ groups consisting of approximately 1000 people in total. Answers were received from 263 people who volunteered to fill out the form (26.0 % response rate). In order to prevent data loss, we stipulated that the answer to each question must be marked so that the form can be successfully completed and sent to the system (when there is a gap, the system prompts the participant to fill in the missing answer). So, there was no missing data, and all items in the forms were filled out. All respondents provided an informed consent at the beginning of the survey with a yes-no question confirming their willingness to participate in the study. For test-retest assessment, Rep(eat)-Q test was re-administered after 2 weeks to 32 participants. Data were collected between March 01, 2021 and May 8, 2021.

MEASURES

Sociodemographic Form

The sociodemographic form included questions on age, sex, marital/education/employment status, psychiatric and medical history, height and weight of respondents.

Repetitive Eating Questionnaire

The Repetitive eating questionnaire (7) is a 12-item self-

report questionnaire designed to assess the frequency of attitudinal and behavioral features of grazing over the past month (e.g., "Ate 'on and off' all day without planning it" or "Could not resist going back to snacking on food even if you were trying to resist doing so"). Responses are rated on a 7-point Likert-scale ranging from 0 (never) to 6 (every day), with higher scores indicating greater frequency. The total score and two subscales, compulsive grazing (CG) and repetitive eating (RE) are calculated by averaging the scale items (6, 7). The Turkish version was developed by translation and back-translation in an iterative process by two bilingual translators and the opinion from the local experts were obtained for the cultural adaptation.

SCOFF Eating Questionnaire

It is a self-report measure used for screening for eating disorders. It has five questions including self-induced vomiting, losing control over amounts of servings, prominent recent weight loss, the perception of being fat, and whether food dominates the respondent's life. In a Yes/No format, two or more "Yes" answers indicate the possibility of an eating disorder. This cut-off is both sensitive and specific for anorexia nervosa and bulimia nervosa(17, 18). The reliability and validity of Turkish form of the scale has been established by Aydemir Ö. et al. in 2015 (Cronbach's alpha coefficient was found to be 0.74 (19).

Yale Food Addiction Scale

Yale Food Addiction Scale (YFAS) has been developed to identify those who are more likely to exhibit addictive-like eating behavior. It was developed based on substance dependence criteria in the DSM-IV-TR (20), (21). It is a 25-item self-report measure includes mixed response categories (dichotomous and Likert-type format). Additionally, two items assess clinically significant impairment or distress from eating. The YFAS is scored as one of the followings 1) a "symptom count" ranging from 0 to 7 that reflects the number of addiction-like criteria endorsed and 2) a dichotomous "diagnosis" that indicates whether a threshold of three or more "symptoms" plus clinically significant impairment or distress has been met. We used "symptom count" scoring in this study. A Turkish validation and adaptation was conducted by Sevincer and colleagues in 2015. Cronbach's alpha coefficient was found to be 0.85 (22).

Eating Disorder Examination Questionnaire

Eating Disorder Examination Questionnaire (EDE-Q) is a 28-item Likert type (0-6) scale that provides a comprehensive assessment of disordered eating behavior. It includes four subscales of Restraint, Eating Concern, Shape Concern, and Weight Concern, plus a global score. The EDE-Q has shown good psychometric properties and the global score has been used as a measure of overall eating psychopathology(23). It is translated and adapted to Turkish by Yucel and colleagues. Cronbach's alpha coefficient was found to be 0.93 (24).

Statistical Analysis

The Statistical Package for the Social Sciences (SPSS) AMOS 23 (Arbuckle JL. 2014, IBM SPSS, Chicago) version was used. Confirmatory factor analysis (CFA) was carried out to test the construct validity of the Turkish version of the Rep(eat)-Q (25). The validity of the models is evaluated with the goodness of fit tests of the data (26). The fit indices used in the research are relative chi-square index (chi-square fit index/degrees of freedom (2/df)), comparative fit index (CFI) (27), general fit index (GFI), normalized fit index (NFI), and root mean square error (RMSEA) (28). The CFI, GFI, NFI> 0.900, $\chi 2/df$ <5, and RMSEA<0.0854 values can be used as acceptable good-fitness criteria (29).

For other validity and reliability analyses in the study, SPSS version 22.0 (IBM Inc, Armonk, NY) was used. Descriptive statistics of the data are presented with n (%), non-normalized variables are shown as "median (min-max)", and variables with normal distribution are shown as "mean ± SD. Cronbach's alpha coefficient showing the internal consistency level, test–retest correlation showing temporal invariance, and item-total score analysis were used to test the reliability of the Turkish version of the Rep(eat)-Q. The relationships between the scales were analyzed using the Pearson correlation coefficient to conduct the convergent, and divergent validity analyses.

Materials and analysis code for this study are available by emailing the corresponding author.

RESULTS

Descriptive Statistics

A total of 263 subjects participated in the study. Of the sample, 203 (77.2%) were women. The mean age of the participants was 34.4 (SD ±10.8). Of the participants 47.5% (n=125) were married, and the rest were single. The distribution of education status was as follows; high

school 53 (20.2%), university 128 (48.7%), postgraduate education 82 (31.2%). The number of those who reported having a psychiatric disorder was 27 (10.3%).

In the comparison between Rep(eat)-Q-CG, Rep(eat)-Q-RE and Rep(eat)-Q-Total scores and sociodemographic variables, scores of females were significantly higher than those of males and scores of singles were higher than married ones as shown in Table 1. In addition, when the Rep(eat)-Q scores were compared in normal weight, overweight and obese individuals, post-hoc analysis revealed that Rep(eat)-Q-CG and Rep(eat)-Q-Total scores were significantly higher in obese group than normal weight (Table 1).

Comparison of Rep(eat)-Q with Sociodemographic, Anthropometric Variables and Illness History

Table 1. *Comparison between Rep(eat) – Q-CG, Rep(eat) – Q-RE and Rep(eat) – Q-Total scores and sosyodemographic variables*

	Rep(eat)-Q-CG	*p*	Rep(eat)-Q-RE	*p*	Rep(eat)-Q-Total	*p*
Gender (n,%)						
Female (203, 77.2)	2.15±1.69	<0.001	2.62±1.59	0.037	2.39±1.53	0.001
Male (60, 22.8)	1.21±1.21		2.15±1.36		1.68±1.18	
Marital status (n,%)						
Single (78, 52.5)	11.97±10.07		16.35±9.39		28.33±18.20	
Married (125, 47.5)	11.22±9.53	0.535	13.69±9.02	0.020	24.92±17.34	0.122
Education (n,%)						
High (53, 20.2)	11.03±9.82		14.88±8.42		25.92±16.69	
University (128, 48.2)	11.53±10.16	0.671	15.40±9.87	0.527	26.94±18.89	0.116
Postgraduate (82,31.2)	12.12±9.33		14.73±8.89		26.85±17.05	
Occupation (n,%)						
Student (57, 21.6)	9.71±8.41		16.31±8.18		26.03±14.61	
Employed (160, 60.8)	12.11±9.92		14.20±9.27		26.31±18.52	
Unemployed (38, 14.4)	11.02±10.48	0.092	16.26±1.03	0.113	27.28±18.51	0.241
Retired (8, 3.0)	18.12±11.60		18.62±1.10		36.75±21.84	
Psychiatric history (n,%)						
Yes (27, 10.3)	14.03±9.62	0.177	16.07±8.84	0.563	30.11±17.18	0.297
No (236, 89.7)	11.34±9.81		14.97±9.35		26.32±17.91	
Medical history (n,%)						
Yes (71, 27)	13.36±10.20		17.71±10.05		31.08±19.03	
No (192, 73)	10.97±9.61	0.481	14.11±8.61	0.203	25.09±17.15	0.398
BMI						
<25 (163, 62)	9.94±8.99		14.20±8.95		16.37±1.28	
25-30 (50,19)	12.94±10.32	0.001	15.18±9.80	0.050	19.40±2.74	0.003
>30 (50,19)	15.76±10.58		17.88±9.51		19.17±2.71	

Rep(eat)-Q-CG: compulsive grazing subscale; Rep(eat)-Q-RE: repetitive eating subscale, BMI: Body mass index

Reliability Analyses

All items had factor loadings> 0.50. For internal consistency, Cronbach's alpha correlation analysis method was used. Cronbach's alpha values were 0.947, 0.916, and 0.931 for total, repetitive and compulsive scores respectively. The mean Rep(eat)-Q total score was 2.23±1.49, the minimum score was 0, and the maximum was 6 points in the current sample.

The Repe(eat)-Q scales showed good temporal stability (r=0.929, p <0.001).

Structure Validity Analyses

For the factor analysis of scale data, the Kaiser–Meyer–Olkin measure of sampling adequacy was 0.932 and the Bartlett's test of sphericity statistic was X^2=2726 (df=66, p <0.001), supporting the appropriateness of factor analysis. It was observed that the two-factor structure explained 74.3% of the total variance.

CFA was conducted to test the two-factor model of the original scale. CFA revealed good fit indexes for the two-factor model to support the two subscales: RMSEA = 0.067, GFI= 0,930, CFI = 0.979, and NFI=0,956 (Figure 1). In addition, all factor loadings were significant for the items (p <0.001). Table 2 shows the CFA findings of the Rep(eat)-Q.

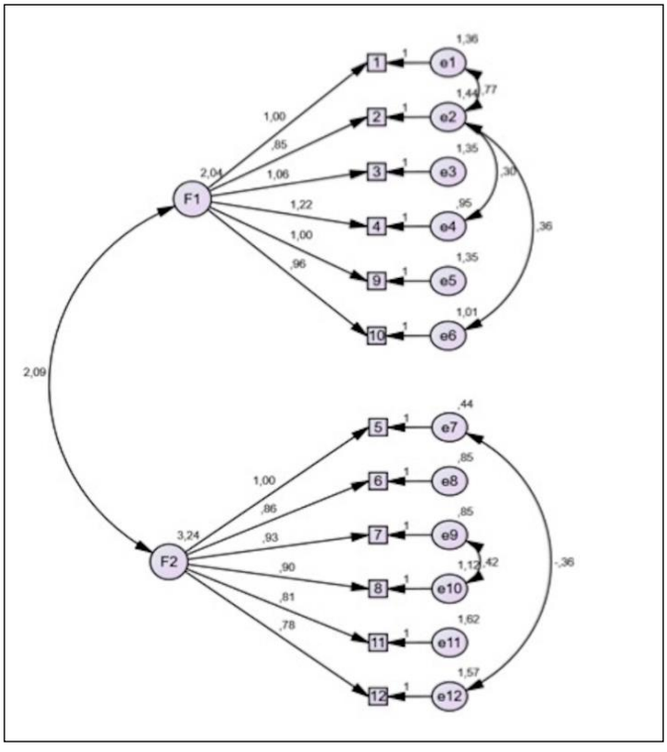

Figure 1. Standardized Regression Coefficients of the Turkish from of the Rep(eat)-Q's CFA

Table 2. Confirmatory factor analysis findings of the Rep(eat)-Q

k	χ^2	df	χ^2/ df	*p* value	CFI	GFI	NFI	RMSEA
12	122,331	48	2,54	<0,001	0,973	0,930	0,956	0,067

k=Number of items ; df= degree of freedom; CFI=Comparative Fit Index; GFI=Goodness of fit index; RMSEA=Root Mean Square Error of Approximation; NFI = Normed fit index

Convergent and Divergent Validity Analyses

Inter-correlations among Rep(eat)-Q and BMI, SCOFF eating questionnaire, EDE-Q, and YFAS are illustrated in Table 3.

In the concurrency analysis, the Rep(eat)-Q is expected to be moderately related to SCOFF eating questionnaire and EDE-Q and highly to YFAS, which was demonstrated as shown below (respectively *r*= 0.396, 0.504, 0.701). Rep(eat)-Q-RE did not significantly correlate with BMI, but Rep(eat)-Q-CG and Rep(eat)-Q-Total showed some correlation (*r*= 0.282 and 0.236).

In the differential validity analysis, there was no relationship of age with the Rep(eat)-Q.

Table 3. Correlations between Rep(eat)-Q and BMI, SCOFF and EDE-Q

	Age	BMI	Rep(eat) -Q-RE	Rep(eat) -Q-CG	Rep(eat) -Q-Total	SCOFF	EDE-Q
Age							
BMI	0.401*						
Rep(eat) -Q-RE	-0.097	0.156**					
Rep(eat) -Q-CG	0.057	0.282*	0.744*				
Rep(eat) -Q-Total	-0.019	0.236*	0.930*	0.937*			
SCOFF	-0.113	0.240*	0.263*	0.471*	0.396*		
EDE-Q	-0.009	0.352*	0.324*	0.610*	0.504*	0.651*	
YFAS	-0.031	0.344*	0.577*	0.728*	0.701*	0.567*	0.678*

*BMI: body mass index; Rep(eat)-Q-CG: compulsive grazing subscale; Rep(eat)-Q-RE: repetitive eating subscale; SCOFF: SCOFF Eating Questionnaire; EDE-Q: Eating Disorder Examination Questionnaire *: p< 0.001; **: p<0.05*

DISCUSSION

The aim of this study is to examine the psychometric properties of the Turkish version of the "Rep(eat)-Q" by conducting a validity and reliability study. The findings of this study are the first data to measure grazing behavior and related factors in the Turkish population.

In the current study, the mean Rep(eat)-Q-Total score was 2.22, which was higher than the mean score of the original article of the scale (7) and the validity and reliability study conducted in Norway (16). This indicates a significant grazing behavior in the current sample.

Rep(eat)-Q Turkish version's reliability was tested by measuring internal consistency and temporal stability. Its internal consistency was evaluated using Cronbach's Alpha reliability coefficient which was found to be 0.947. This figure is very close to the value of 0.912 found in the original study of the scale (7) and the value of 0.920 in the study conducted in Norway (16). The present scale showed good temporal stability, which was also demonstrated in another study from Portugal (7). In addition, factor analysis , similar to the original scale, (7), revealed a two-factor structure, where all items in the scale were homogeneous and statistically significantly correlated with the total scale. These all support the reliability of the two-factor Rep(eat)-Q Turkish version in a community sample.

For the validity of the scale, we compared Rep(eat)-Q scores with certain eating behavior measures as described in the method section. It yielded that the Rep(eat)-Q-Total and two subscale scores were

positively correlated with the EDE-Q, SCOFF and YFAS total scores, which was more evident in compulsive subscale, which is in line with findings from previous studies (30) (7, 9, 10). In the original study of the scale, they found a moderately significant positive correlation between EDE-Q and Rep(eat)-Q (7) . In another study from Norway (16), Rep(eat)-Q-Total and both subscale scores showed a significant positive correlation with eating disorder scores in the same study, authors reported that those with high compulsive subscale scores were found to have a significantly more eating disorder, especially binge eating disorder, compared to those with high repetitive subscale scores. Results of the current study support the previous findings that Rep-(eat)-Q, particularly compulsive subscale, correlates with eating psychopathology and requires further studies on larger samples. In the current study, the Rep(eat)-Q-Total and subscale scores were significantly higher in women than in men. In the validity and reliability study conducted in Norway in a community sample, (16), total and subscale scores were significantly higher in women compared to men similar to our findings. In the original study of the scale (7), while there was a significant difference with higher compulsive and total scores in women, no difference was reported in the repetitive scores of the community sample of the study. The gender data of the present study seems to support the findings in the literature (6, 30). Regarding the age however, no significant correlation was found between age and Rep(eat)-Q-Total and subscale scores. Some studies reported similar findings to ours, demonstrating no relation with age (31), (16). Whereas the original study of the scale found high scores in Rep(eat)-Q-Total and compulsive subscale in younger subjects of the community sample (7). In the current study, the age range was not very wide, which might account for not finding a correlation in this area. There was no relation between the education/employment status of the participants and their Rep(eat)-Q scores. However single persons reported significantly more repetitive eating than married ones. We could not find any data on these parameters in relation to grazing in the literature, which needs to be delineated in further studies.

The mean BMI in the sample was just below the overweight threshold (24.70) according to WHO guidelines (32) There was a significant correlation between BMI figures and the Rep(eat)-Q scores. Those who were obese reported significantly more grazing behavior compared to normal-weight subjects. This difference was observed in total and compulsive subscales., which support the previous studies suggesting a link between obesity and grazing, particularly through compulsive behavior (7).

In the current study, participants were asked to report the presence of their psychiatric history. It revealed that out of all respondents, 10.3 % had a current psychiatric illness. No significant difference was found between those with and without a psychiatric illness in terms of Rep(eat)-Q scores. Data on this seems limited and conflicting. It was found in a study that the frequency of major depression and unspecified anxiety disorder was significantly higher in people with high compulsive subscale scores (33), and there is another study reporting conflicting data on the relationship between psychopathology and Rep(eat)-Q (10). The relationship between grazing and psychiatric disorders would warrant further and more focused research.

This study comes with certain limitations. As an online survey, those who volunteered to participate could be different from those who did not, resulting in selection bias. In addition, reliance on self-report measures is likely to present more subjective data in comparison to clinical assessment. The sample was from a non-clinical population with a higher proportion of women, making it hard to generalize findings. Notwithstanding the above limitations, the findings of this study provide initial valuable data on the grazing behavior of the Turkish population as well as being the first to examine the psychometric properties of Rep(eat)-Q.

CONCLUSIONS

The results of this study show that the Turkish version of Rep(eat)-Q is a valid and reliable tool for evaluating grazing behavior in a non-clinical Turkish sample. It also confirms the proposed two-factor structure (compulsive and repetitive), supporting two subtypes of grazing behavior. There was a significant grazing behavior in the current sample which correlated with female gender, higher BMI, and eating psychopathology. More studies are needed to evaluate its psychometric properties in clinical subgroups.

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